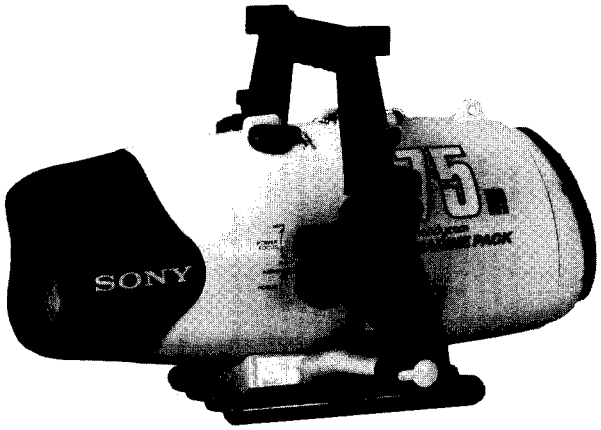
MPK-V88

SERVICE MANUAL

AEP Model
UK Model
E Model
Australian Model



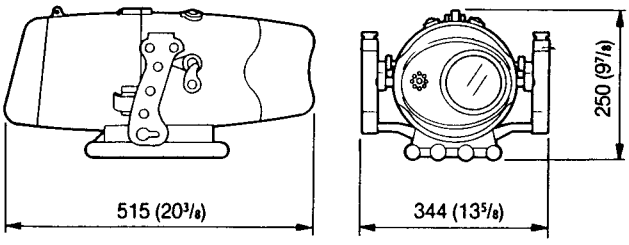
Handycam

SPECIFICATIONS

Compatible equipment

U.S.A and Canada	CCD-V11, CCD-V99
Other countries	CCD-V88E, CCD-V900E

Material Plastic (ABS and PC), glass
Waterproof O-ring, 3 buckles
Usable depth Up to 75 meters (246 feet)
Power sources One battery pack NP-77
Underwater microphone
Peizoelectric microphone
Controllable function
Power on/off, recording start/stop, zooming, focusing, monitoring
Dimensions Unit: mm (inch)



Weight Approx. 14.5 kg (31 lb 15 oz)
Accessories supplied
Pedestals (2)
Power connecting cord (1)
Arm (1)
Wide conversion lens (1)
Battery adaptor NPA-80 (1)
LCD color monitor XV-M3 (1)
Spare O-ring (1)
Spare waterproof gasket (1)
Grease (1)

Design and specifications are subject to change without notice.

MICROFILM

HANDYCAM MARINE PACK

SONY®

SECTION 1
GENERAL

This section is extracted from instraction manual.

Maintenance

After recording

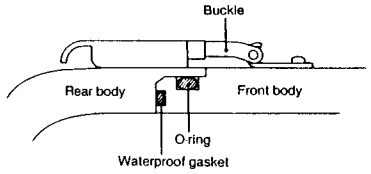
After recording in the sea, submerge the marine pack with the buckles fastened thoroughly in fresh water for a while so that the sea water is removed. Then wash it with fresh water and dry it with a soft cloth. Clean the video camera recorder and the inside of the marine pack with a dry soft cloth.
Do not use any type of solvent, such as alcohol or benzine for cleaning, as this might damage the finish. Be sure to perform the above procedure every time the marine pack is used in the sea.
If the sea water remains on the marine pack, the metal parts may get rusty or the operation lever becomes hard to move.

When storing the marine pack

Grease the O-ring and waterproof gasket, put them in the grooves correctly and put the transport cover. Joint the marine pack without fastening the buckles and place it in a cool place.
Avoid storing the marine pack in a hot or very cold place, in a place subject to direct sunlight or excessive dust, or together with naphthalene or camphor. This will damage the marine pack.

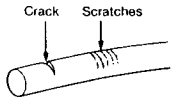
Notes on the O-ring and Waterproof Gasket

The O-ring and waterproof gasket assure the waterproof function of the marine pack. To maintain waterproof integrity, use them correctly. Incorrect operation may cause water to leak in.



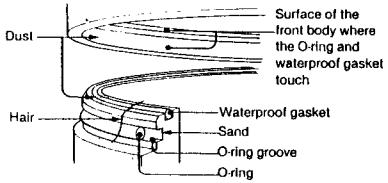
Check that there are no scratches or cracks.

Scratches or cracks on the O-ring or waterproof gasket may cause water to leak in. If there are any, replace the damaged O-ring or gasket with a new one.
Do not remove the O-ring or gasket from the groove with a metal tool or a tool with a sharp point.



Remove any dust, sand or hair from the waterproof gasket.

Check there is no dust, sand or hair on the O-ring or waterproof gasket, or in the groove or on the surface where it touches. If there is, remove them completely, or the O-ring or gasket and the surface of the marine pack body may be damaged and water may leak in.

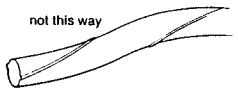


Grease the O-ring and waterproof gasket.

The grease protects the O-ring and gasket from wear.
After checking that there are no cracks or dust on the O-ring and gasket, grease them using a finger. During greasing, recheck that there are no cracks or dust.
Never use cloth or paper for greasing because the fibers may cling.

Do not twist the O-ring and waterproof gasket.

Put the O-ring and gasket in the grooves evenly. Never twist them.



Do not trap the O-ring and waterproof gasket with the marine pack.

When jointing the marine pack, be careful not to trap the O-ring or gasket between the front and rear bodies. If this happens, not only will the O-ring or gasket be damaged, but also water may leak in.

Storage

Store the supplied spare O-ring and waterproof gasket in a cool place, packed in the original carton. Be sure to avoid the following:
- Exposing to direct sunlight.
- Placing a heavy object on the O-ring or gasket.
- Folding the O-ring or gasket.

Useful life of the O-ring and waterproof gasket

It depends upon the maintenance and the length of use, but we recommend changing it every one or two years.
Use the Sony ACC-804 marine pack maintenance kit (optional) to replace.

Precautions

On the video camera recorder

Be careful not to expose the equipment to salty air nor to drip sea water on the equipment.
- Avoid opening the marine pack on the sea or at the seaside. Preparations such as installing and checking the equipment should be made in a place with low humidity and no salty air.
- When a video camera recorder and a monitor TV are to be used on the sea or at the seaside for a long period of time, we recommend that they are checked periodically by a Sony service facility.
- If the equipment becomes wet, take it immediately to the nearest Sony service facility for preventive maintenance.

On the marine pack

- If the marine pack is put in the water after being opened and jointed in a place with high temperature and high humidity, moisture condensation may occur, causing the glass to fog up and perhaps damaging the equipment.
- The waterproof integrity of the marine pack is maintained by the O-ring and waterproof gasket, and the grooves and surfaces where they touch. Be especially careful not to damage or deform those areas.
- Before jointing the marine pack, check these areas to see that there are no cracks, dust, sand, hair, etc., and that the O-ring and waterproof gasket are lightly greased.
- Do not leave the marine pack under direct sunlight for a long period of time, otherwise the temperature in the pack may rise and the equipment in the pack may be damaged.
- If you cannot avoid leaving the marine pack under direct sunlight, be sure to cover the pack with a towel or other protection.
- Do not throw the marine pack into the water, lower it gently into the water.

On recording underwater

- We recommend you to check before diving that the equipment operates correctly and there is no water leakage at a depth of about one meter (3 feet).
- Be sure to follow the safety rules for diving such as diving period, depth, etc.

When opening the marine pack

To prevent the video camera recorder from getting wet, take care on the following points.
- Dry the marine pack well.
- Soak up any water between the front and rear bodies with a towel.
- Make sure you are dry. Take care that no water drops from your wet suit.

On transportation

- To transport the marine pack for a long distance, remove the video camera recorder or it may be damaged.
- To transport the marine pack by air or by car, pack it in the Sony LCH-M30 Marine Pack Carrying Case (optional) or repack it in the original shipping carton with the associated packing materials.
- To move the marine pack by car with the video camera recorder in positon, use cushioning so that shocks or vibration are avoided as much as possible. Be sure to secure the pack firmly so it will not turn over.

Sony does not accept liability for damage to the video camera recorder, battery, etc. in the marine pack and for the cost of recording if water leakage occurs caused by incorrect operation.

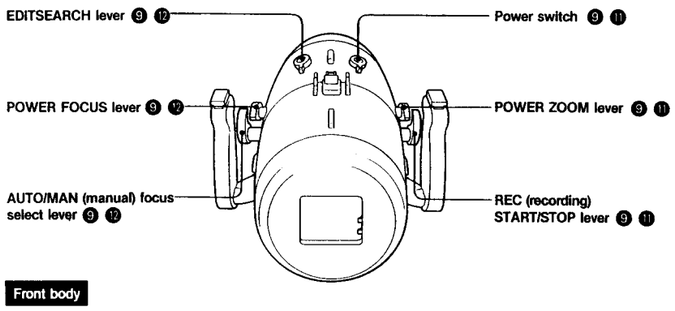
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

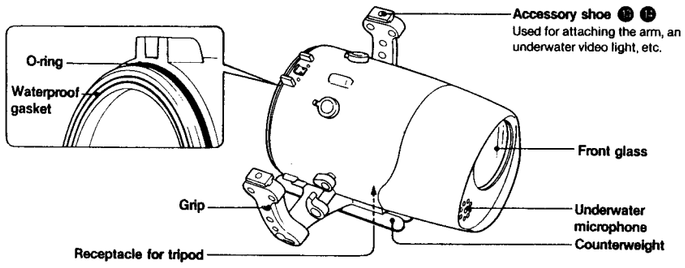
Component of the Marine Pack

For further details, refer to the page numbers next to each item.

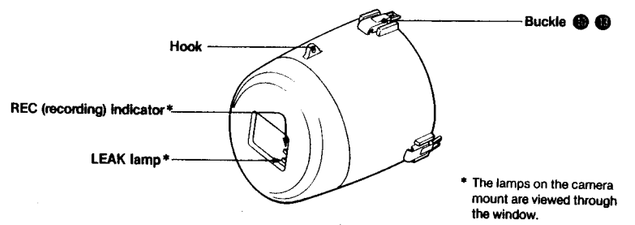
Operation levers


EDITSEARCH lever 9 12
Power switch 9 11
POWER FOCUS lever 9 12
POWER ZOOM lever 9 11
AUTO/MAN (manual) focus select lever 9 12
REC (recording) START/STOP lever 9 11

Front body



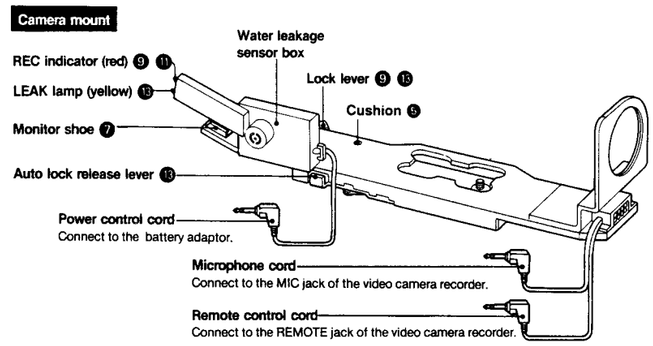
Rear body



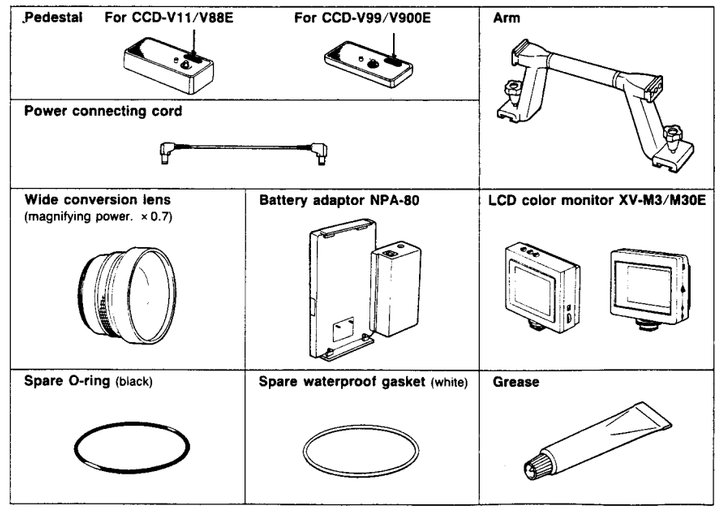
* The lamps on the camera mount are viewed through the window.

Component of the Marine Pack

Camera mount


Water leakage sensor box
REC indicator (red) 9 11
LEAK lamp (yellow) 18
Lock lever 9 13
Cushion 5
Monitor shoe 7
Auto lock release lever 13
Power control cord
Connect to the battery adaptor.
Microphone cord
Connect to the MIC jack of the video camera recorder.
Remote control cord
Connect to the REMOTE jack of the video camera recorder.

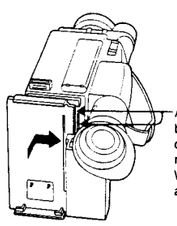
Accessories supplied



Preparation before recording

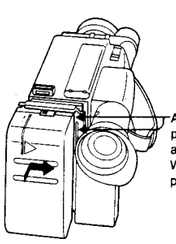
1 Attach the video camera recorder to the camera mount.

1 Attach the battery adaptor to the video camera recorder.



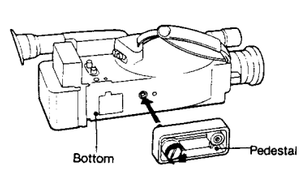
Align the right side of the battery adaptor with the line on the video camera recorder.
While pressing the battery adaptor, slide it to the right.

2 Attach the NP-77 battery pack (optional) to the battery adaptor.



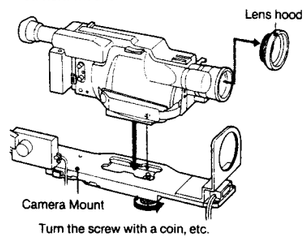
Align the right side of battery pack with the line on the adaptor.
While pressing the battey pack, slide it to the right.

3 Attach the pedestal to the video camera recorder.



Turn the screw with a coin, etc.

4 Attach the video camera recorder on the camera mount.

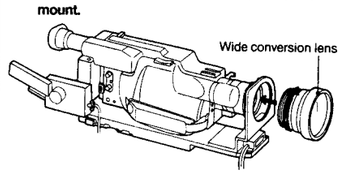


Turn the screw with a coin, etc.

- Remove a lens cap and a lens hood from the video camera recorder.
- Remove a filter, such as a protector, if it is in use.

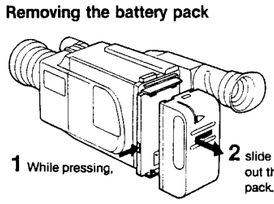
When removing the lens hood or filter, holding the focus ring, press the lens hood or filter with your palm and turn counterclockwise.

5 Attach the wide conversion lens to the camera mount.



By attaching the wide conversion lens, the shooting coverage becomes wider, although the subject is shot smaller at 70 percent.

Removing the battery pack

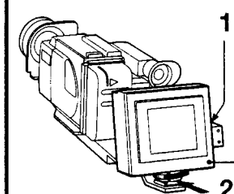


1 While pressing,

2 slide and pull out the battery pack.

2 Attach the monitor to the camera mount.

Viewing the indications and picture on the monitor, adjust focusing, zooming, etc.

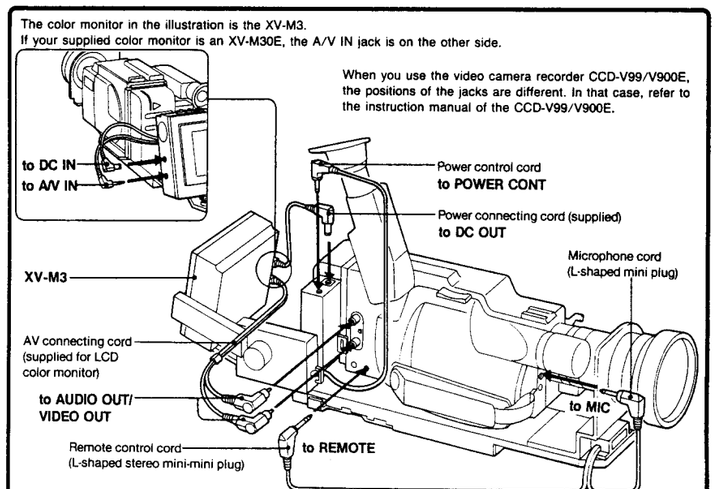


1 Turn on the monitor.
Set the volume of the monitor to the minimum.
Please read the operating instructions of the monitor for further details.

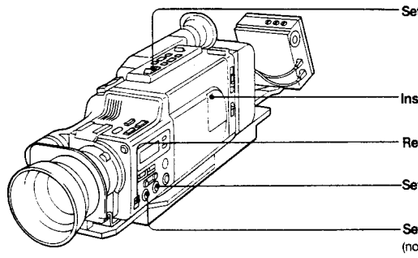
2 After inserting the monitor to the monitor shoe of the camera mount, fasten the screw.

3 Connect cords.

The color monitor in the illustration is the XV-M3.
If your supplied color monitor is an XV-M30E, the A/V IN jack is on the other side.

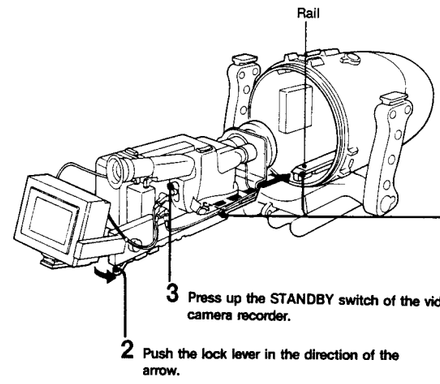

When you use the video camera recorder CCD-V99/V900E, the positions of the jacks are different. In that case, refer to the instruction manual of the CCD-V99/V900E.
to DC IN
to A/V IN
Power control cord
to POWER CONT
Power connecting cord (supplied)
to DC OUT
Microphone cord
(L-shaped mini plug)
XV-M3
AV connecting cord
(supplied for LCD color monitor)
to AUDIO OUT/ VIDEO OUT
to MIC
Remote control cord
(L-shaped stereo mini-mini plug)
to REMOTE

4 Preset the video camera recorder.

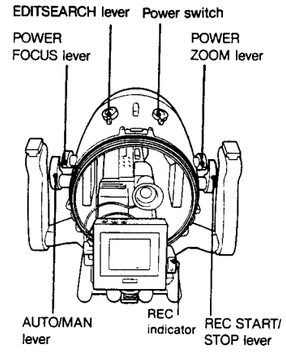

Set POWER switch to CAMERA.
Insert a cassette.
Release the AUTO LOCK switch (lower side).
Set WHITE BAL switch to ☀
Set SHUTTER SPEED at 1/60 seconds
(normal speed). (No indication in the viewfinder)

5 Install the video camera recorder in the front body.

The transport cover should be removed.


Rail
1 Insert the video camera recorder along the rail until it clicks.
3 Press up the STANDBY switch of the video camera recorder.
2 Push the lock lever in the direction of the arrow.

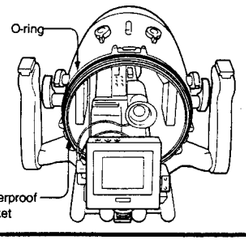
4 Viewing the monitor, make sure that the video camera recorder functions.



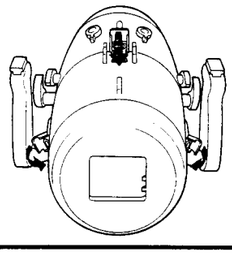
- Turn the power on to see if a picture appears on the monitor.
- Pull the REC START/STOP lever to see if the REC indicator lights up.
- Pull the AUTO/MAN lever to select manual or auto focusing.
  (The focus indication will appear on the monitor in the manual mode.)
- Try zooming by the POWER ZOOM lever.
- Try forwarding/rewinding the tape by the EDITSEARCH lever.
  After trial recording, pull the REC START/STOP lever again to enter standby mode. Then turn the EDITSEARCH lever to the right (forward) or the left (rewind).
  Does the picture on the monitor advance or reverse?

6 Joint the front and rear bodies.

1 Check that the O-ring and waterproof gasket are in place, and grease them lightly.
(See page 15).

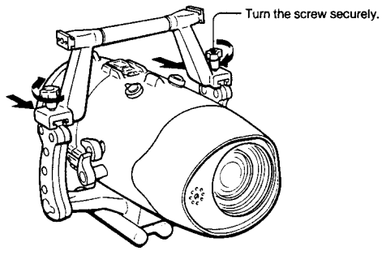


2 Press the rear body to the front body and fasten the three buckles securely.



Attaching the arm

It is easier to carry by the arm.



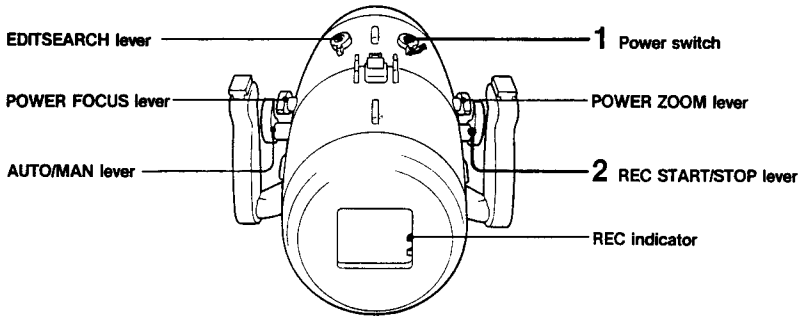
The marine pack is now ready for recording.

Note

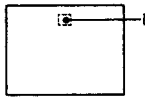
Turn off the power to prevent the battery from wasting.

Operation

Recording



1 **Turn on the power.**



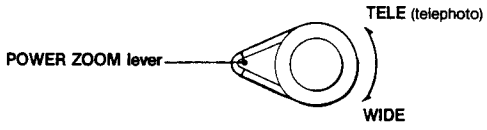
Indications on the monitor

- Focus is automatically adjusted.
- Iris is automatically adjusted.

2 **Pull the REC START/STOP lever momentarily to start recording.**

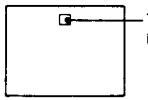
The REC indicator (red) will light up.
To stop recording, pull the REC START/STOP lever again.
The video camera recorder will enter standby mode and the REC indicator will go off.

Zooming



Manual focusing

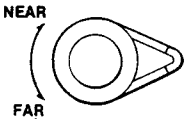
1 **Pull the AUTO/MAN lever momentarily to select manual focusing.**



Indications on the monitor

2 **Move the POWER ZOOM lever to telephoto position.**

3 **Move the POWER FOCUS lever upward or downward to achieve sharp focus.**



4 **Set the desired shot length using the POWER ZOOM lever.**

5 **Pull the REC START/STOP lever momentarily to start recording.**

To stop recording, pull the REC START/STOP lever again.

For auto focusing, pull the AUTO/MAN lever again.

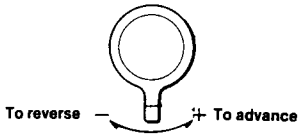
Note

If you do not record for a long period of time, switch off the power.

During recording, to record again on the previous recorded portion

1 **Pull the REC START/STOP lever to enter standby mode.**

2 **By monitoring the picture, move the EDITSEARCH lever to the right to advance, or to the left to reverse the picture to locate the point from which the recording is to begin.**

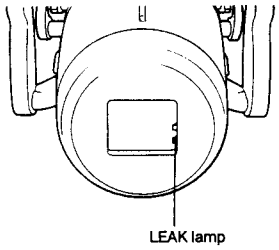


3 **At the desired point, release the EDITSEARCH lever.**

4 **Pull the REC START/STOP lever to start recording.**

When the LEAK lamp Blinks

If water happens to leak in, the LEAK lamp (yellow) blinks and the buzzer sounds.

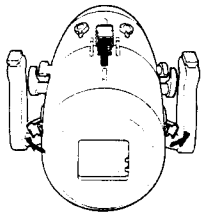


In such a case, remove the marine pack from the water as soon as possible, keeping it horizontal. Be sure to follow the safety rules for diving.
After drying with soft cloth, open the marine pack.
To switch off the lamp and buzzer, pull the power control cord out of the battery adaptor.
Check the causes of the leakage. If the video camera recorder gets wet, take it to the nearest Sony service facility immediately.

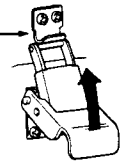
Removing the Video Camera Recorder

1 Open the marine pack.
Before unfastening the buckles, wash the marine pack with fresh water and dry it with a soft cloth. (See page 17).

1 Unfasten the three buckles.



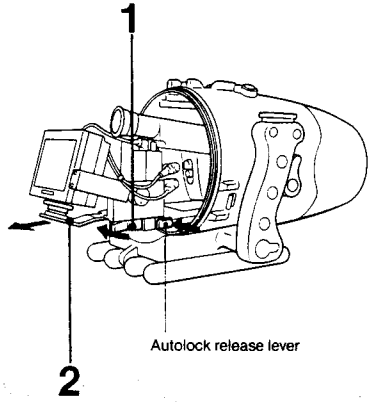
2 Set the end of a buckle to the rear of the catch and press the buckle plate in the direction of the arrow.



2 Remove the video camera recorder from the front body.

1 Unlock the camera mount by pressing the lock lever in the direction of the arrow.

2 While pressing the auto lock release lever, pull the video camera recorder out of the front body.



Hints on Underwater Recording

Recording underwater is different from recording on land because it is affected by the clarity and depth of the water, light input and objects around the subject. The following are hints for good recording underwater.

Color underwater

Water absorbs light, especially red light so that subjects in deep water are seen as bluish. The color is also affected by the clearness of the water.

Best time for recording

The best recording time is from 10 a.m. to 2 p.m. When the sun is high in the sky, optimum results can be obtained. To record at night, use powerful light.

Subject size underwater

Since the refractive index underwater is higher than that in air, an object looks closer by 1/4, and therefore larger, underwater than in air. The lens on the video camera recorder is affected by this phenomenon as well. Therefore, the wide conversion lens, which covers a wide range, is effective underwater.

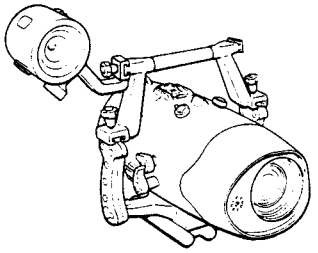
Camera work in slow and stable motion

When recording, keep your body stable. An unstable shot will be magnified on the TV screen.
Move the video camera recorder as slowly as possible. A subject such as a fish moves itself and enables you to make an attractive program without moving the video camera recorder.

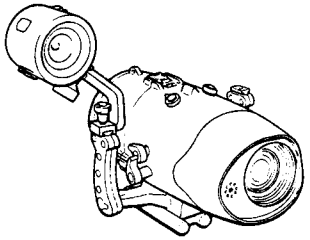
Underwater video light

In a deep place or under rocks where direct sunlight does not reach, recording with artificial lights is recommended. Attach the Sony HVL-80D underwater video light or equivalent to the right or left accessory shoe of the arm or the grip.

To the arm



To the grip



1. Concerning Defects

Marine Pack defects are classified as the three following types.

1) **Operational defects**
   This type mainly involves malfunctions caused by electrical circuit or parts defects. Repair is the same as for normal products.
2) **Damaged and missing parts**
   Waterproofing is sometimes affected by the locations of defects and symptoms. Before making repairs, always use the check list to check the type of defect.
   Note : Refer to pages 11 and 12 for the check list.
3) **Water leaks**
   After the discovery of a defect or after making repairs, it is necessary to perform either a hydraulic pressure test or simple water leak test using a water tank.

2. Concerning Water Leaks

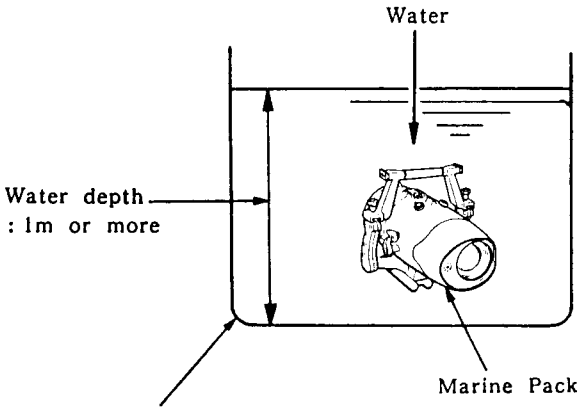
To ensure waterproofing, O-rings are used in the holes in the Marine Pack housing for openings, shafts, display windows and the front glass. Water leaks are possible in any of these locations but the conditions under which water leaks occur differ for the openings and the other parts.

1) **Water leaks at openings**
   Openings are waterproofed using O-rings compressed by the force of the buckle spring.
   Near the surface of the water, where little water pressure is applied to Marine Pack, the force of the buckle alone provides sufficient waterproofing. As the water pressure applied to Marine Pack increases at greater depths, however, the force applied to the O-rings increases due to the water pressure to increase the waterproofing.
   Because of this, due to the type of waterproofing construction used, opening water leaks are more prone to occur in shallow water (approx. 2 meters) than in deep water.
   Also, since there are is a gap between the front and rear housings, sand and dirt tend to enter and adhere to the O-ring in shallow water. When the cover is opened, this sand and dirt can then enter under the O-ring and cause a water leak the next time Marine Pack is used.
   This, most water leaks in the openings are the result of adhered dirt, sand, hair and other foreigh matter as well as O-ring and housing damage due to careless handing.
2) **Water leaks at other openings**
   Parts where there are holes in the housing (shafts, display window, front and rear glass) are constructed with O-rings mechanically compressed by screws and nuts.
   Due to the construction, these places cannot be reached with the hands : therefore, the waterproofing is more secure than that of the openings.
   The causes of water leaks are damage of the parts compressing the O-rings, loosening of the screws and nuts fastening the parts and improper reassembly.

3. Water Leak Check Methods

After the discovery and repair of a water leak, it is necessary to perform a hydraulic pressure test and water leak test using a water tank.

1) **Opening water leak check method**
   As was mentioned above, due to the construction, water leaks in openings are more prone to occur in shallow water than in deep water. Consequently, a simple water leak test using a water tank is sufficient in many cases, without performing a hydraulic pressure test.
   ***Water leak test**
   In this method, Marine Pack immersed in a tank filled with water and checked for water leaks.
   Marine Pack should be left immersed in the water tank (or bathtub, swimming pool, etc.) for at least 15-20 minutes with the covers closed. The water depth should be at least 1 meter.



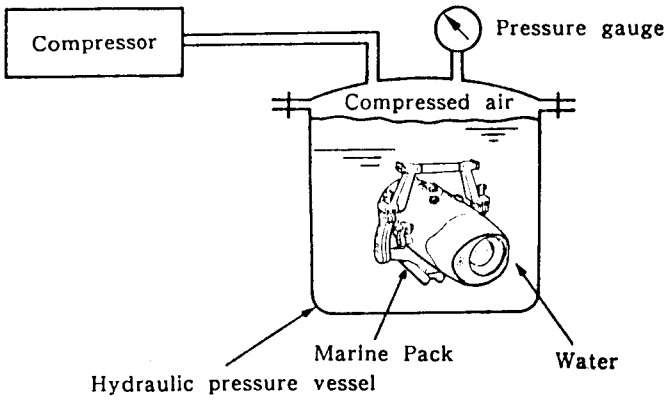
2) **Water leak check methods for other waterproofed locations.**

In addition to water leaks caused by damaged parts and loose screws, there are also water leaks at other waterproofed locations which cannot be detected with a water leak test : therefore, the hydraulic pressure test must be used.

****Hydraulic pressure test**

In this test, Marine Pack is immersed in a water tank called a hydraulic pressure vessel, pressure is applied using compressed air and checks are made for water leaks and the ability to withstand water pressure is tested.

Extreme pressure is applied to Marine Pack underwater. Water leaks may occur when this pressure is first applied. In such cases, the water leak check must be made using the hydraulic pressure test with a hydraulic pressure vessel.



4. Causes of Water Leaks (excluding parts damage)

Water leaks in openings

1) When the covers have been closed with sand, dirt and hair adhered to the O-rings, O-ring grooves, housing O-ring contact surface or waterproof packing.
2) When the cover is closed with an O-ring out of its groove or a cord is caught in the cover.
3) When an O-ring is damaged or cracked (aging).
4) When there is a long scratch which crosses the housing O-ring contact surface.
5) When a cover is not tightly closed due to a defective buckle.

- **Water leaks at other waterproofed locations**

6) When there are scratches on the surfaces of the parts which compress the O-rings.
7) When the Parts which compress are loose.
8) When tightening with sand, dirt and hair adhered to an O-ring or part which compresses the O-ring.
9) When an O-ring has not been installed.

Causes 1)-5) and 9) above can be discovered relatively easily using the water leak test described above.

5. Water Leak Repair Methods

- **Relatively light scratches on O-ring contact surfaces can often by repaired by polishing.**

Caution should be exercised concerning the following points.

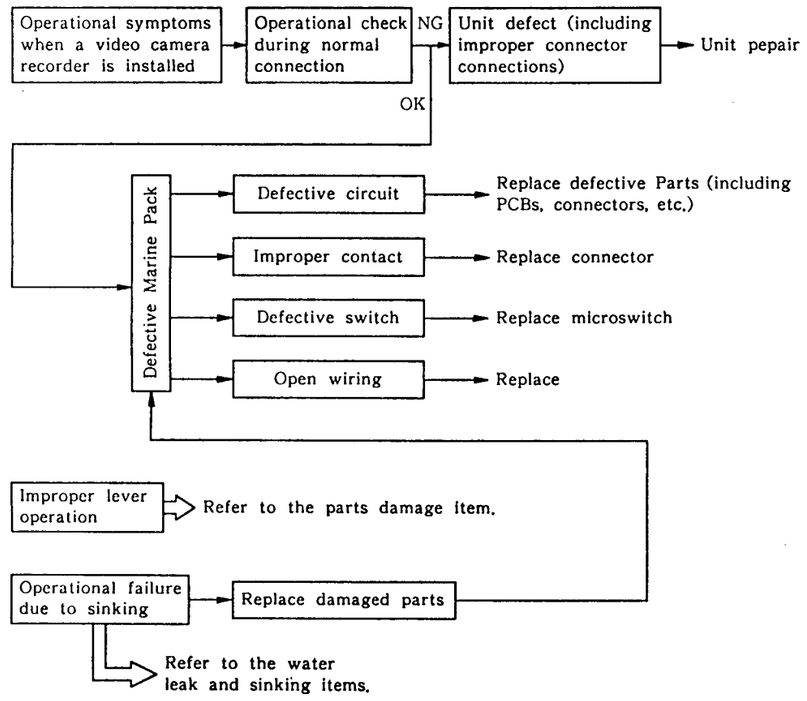
1) Only extermely light scratches can be repaired.
2) Use number 600-1000 waterproof sandpaper for repairs and apply water while polishing.
3) Polish the scratch area smoothly using care not to create local indentations.
4) Do not use putty to make repairs since such repairs will fail under water pressure.

- **Checks and cautions**

1) Make sure that there are no scratches on the housing O-ring contact surfaces.
2) Make sure that there are no scratches or cracks in the O-rings.
3) Always coat the O-rings with grease by hand and make sure that the O-rings are not twisted when installed.

6. Repair Location and Hydraulic Pressure Test

When a defect is discovered or a repair is made at a location related to the waterproofness of Marine Pack, the hydraulic pressure test must be performed.
Repairs at locations which require the hydraulic pressure test, and the hydraulic pressure test itself, are performed at the factory : therefore, always check the type of defect using the check list before making repairs.

Type of defect	Defect location and repair method	Hydraulic pressure test
Improper operation		Unnecessary

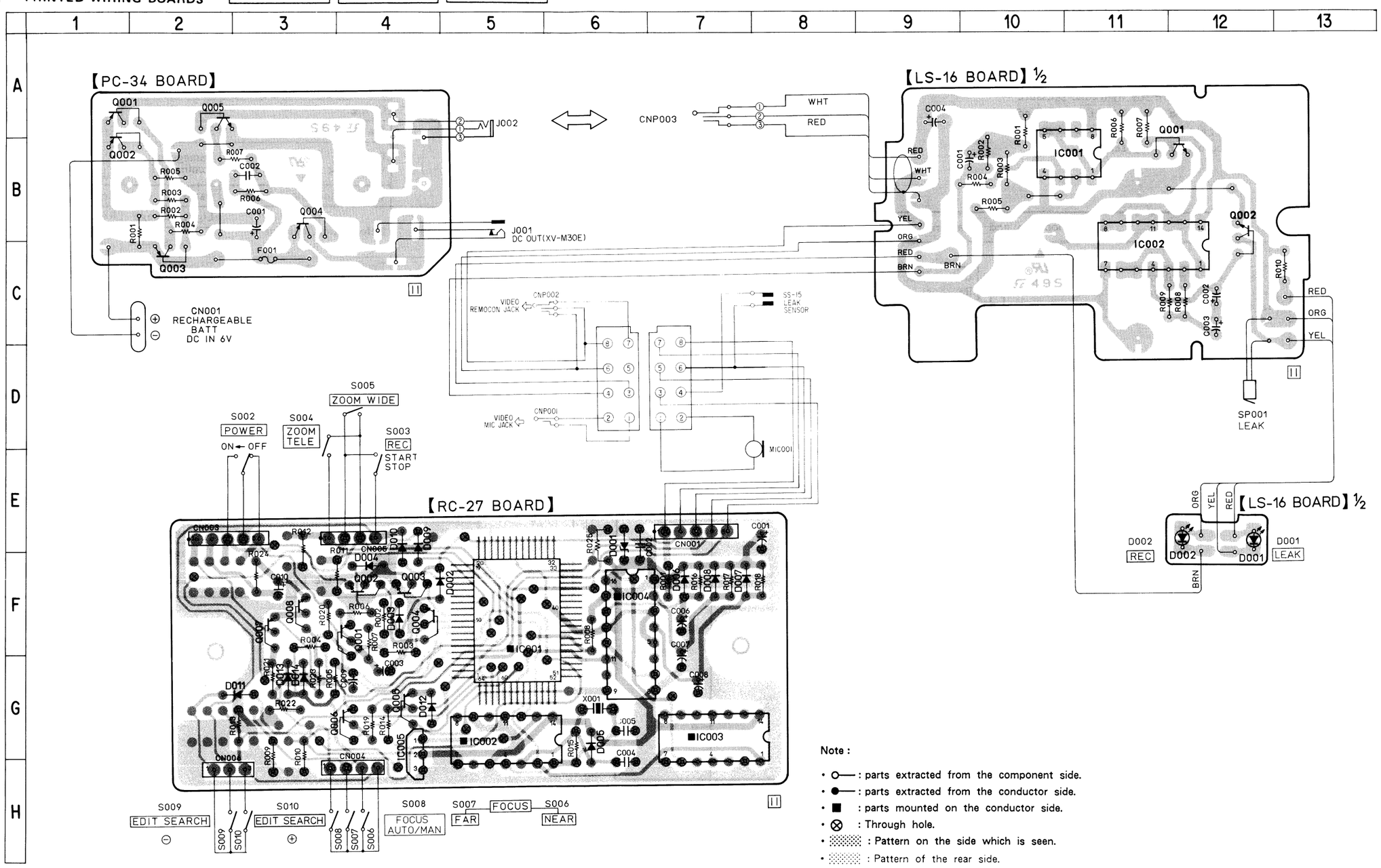
Type of defect	Defect location/symptom			Repair method	Hydraulic pressure test
Parts damage	Housing related	Exterior part damage	Scratch	Replace part	Necessary
		Waterproofing O-ring	Light damage	Polish using waterproof sandpaper	Necessary
			Heavy damage	Replace part	
		O-ring	Scratch, aging	Replace part (life : 2 years)	Unnecessary
		Waterproofing packing	Scratch, aging	Replace part	Unnecessary
		Buckle (including mounting screw)	Damege or coming off	Replace part (repair housing when screws are affected)	Unnecessary
		Underwater microphone	Damage	Replace part	Necessary
	Grip area	Deformation, damage	Light damage	Replace part	Unnecessary
			Heavy damage	Housing repair (overhaul mounting section)	Necessary
	Front glass section	Front protector	Damage, loss	Replace part	Unnecessary
		Front glass	Damage	Replace part	Necessary
	Rear glass section	Rear protector	Damage, loss	Replace part	Unnecessary
		Rear glass	Damage	Replace part	Necessary
	Lever related REC START/STOP lever Power zoom lever, Power supply lever, EDIT SEARCH lever Power Focus & Focus CH lever	Lever	Damege or coming off	Replace part	Necessary
		Lever shaft	Deformation	Replace part	Necessary
		Bearing	Deformation, scratch	Replace part	Necessary
	Video camera recorder mounting base area	Camera mount	Damage	Replace part	Unnecessary
		Water leakage sensor box.	Damage	Replace part	Unnecessary
	Remote control section	Remote control case	Damage	Replace part	Unnecessary
	An accessory	Wide-conversion lens	Damage, loss	Replace part	Unnecessary
		Battery adaptor	Damage, loss		
Sinking due to water leak	Determine cause using the hydraulic pressure test.			Repair the defect or replace the part.	Necessary

SECTION 2
DIAGRAMS PC-34 LS-16 RC-27

PRINTED WIRING BOARDS

● SEMICONDUCTOR LOCATION

Ref. No.	Location
PC-34 BOARD	
Q001	A-1
Q002	B-1
Q003	C-2
Q004	B-3
Q005	B-2
RC-27 BOARD	
IC001	F-5
IC002	G-5
IC003	G-7
IC004	F-6
IC005	G-4
Q001	F-4
Q002	F-4
Q003	F-4
Q004	F-4
Q005	G-4
Q006	G-4
Q007	F-3
Q008	F-3
D001	E-6
D002	F-4
D003	F-4
D004	F-4
D005	G-6
D006	F-7
D007	F-7
D008	F-7
D009	E-4
D010	E-4
D011	G-3
D012	G-4
D013	G-3
D014	G-3
LS-16 BOARD	
IC001	B-10
IC002	C-11
Q001	B-12
Q002	B-12
D001	F-12
D002	F-12

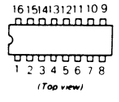


Note :

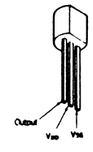
- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ■ : parts mounted on the conductor side.
- ⊗ : Through hole.
- ▩ : Pattern on the side which is seen.
- ▩ : Pattern of the rear side.

SEMICONDUCTOR LEAD LAYOUT

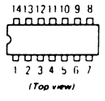
HD14538BP



S-8054ALB

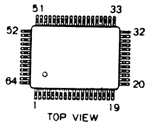


SN74LS33N
TC4011BP
TC4024BP
TC4069UBP



μPC393C

μPD7503G-A71-12



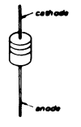
DTA124XS
DTA144ES
DTC124XS
DTC144ES
2SA1048-GR

2SB733

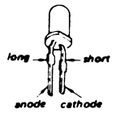
2SC2785

2SK591

RD5.1ES-B1
1SS119

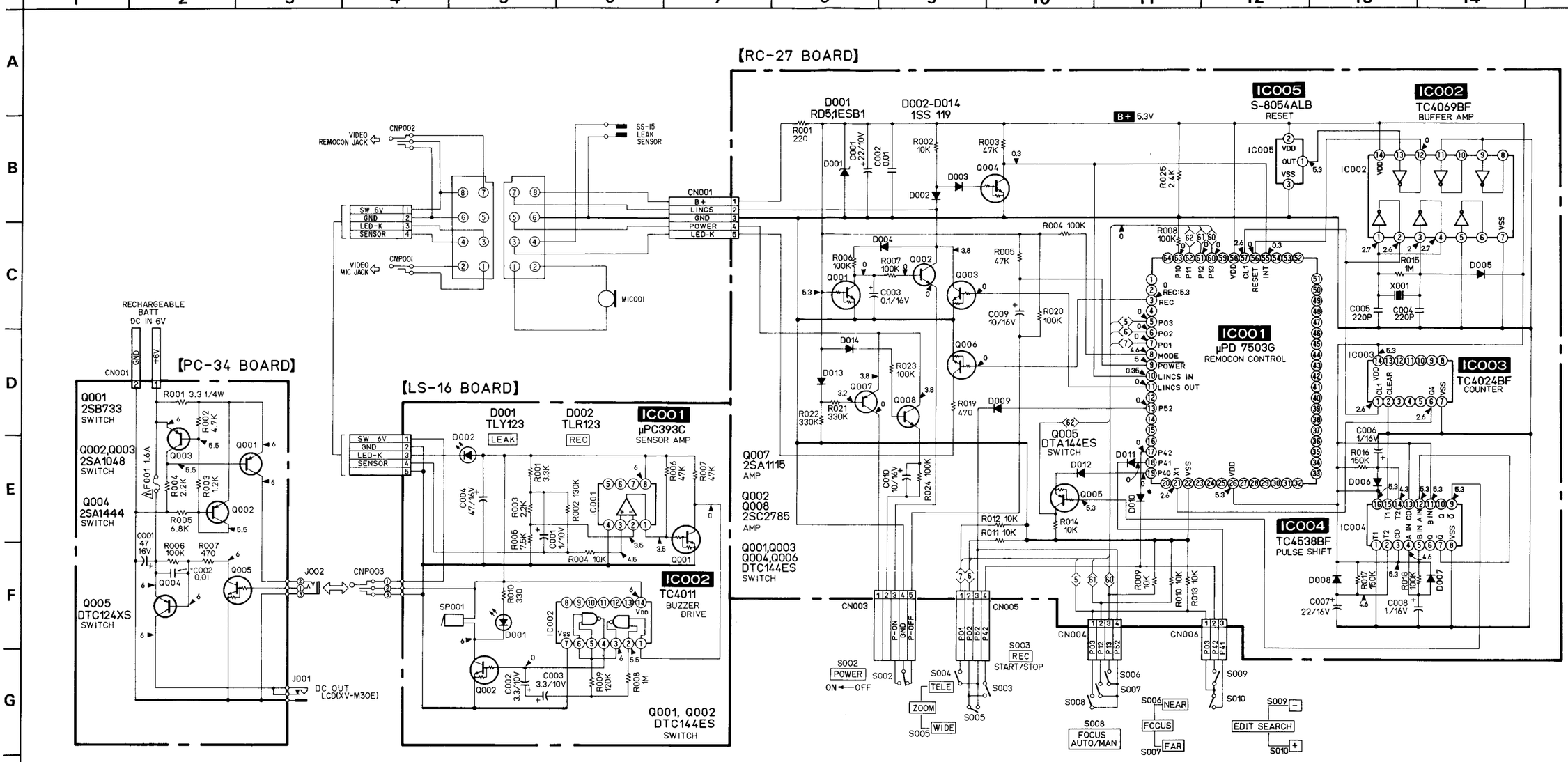


TLR123
TLY123



SCHEMATIC DIAGRAM

PC-34 | LS-16 | RC-27



Note :

- All capacitors are in μ F unless otherwise noted. pF : μ μ F 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- Switch

Ref. No.	Switch	Position
S002	POWER	OFF
S003	REC START/STOP	OFF
S004	ZOOM TELE	OFF
S005	ZOOM WIDE	OFF
S006	FOCUS NEAR	OFF
S007	FOCUS FAR	OFF
S008	FOCUS AUTO/MAN	OFF
S009	EDIT SEARCH ⊖	OFF
S010	EDIT SEARCH ⊕	OFF

- B+ : B+ Line
- Voltages are taken with a VOM (50k Ω/V). Voltage variations may be noted due to normal production tolerances.

SECTION 3
EXPLODED VIEWS

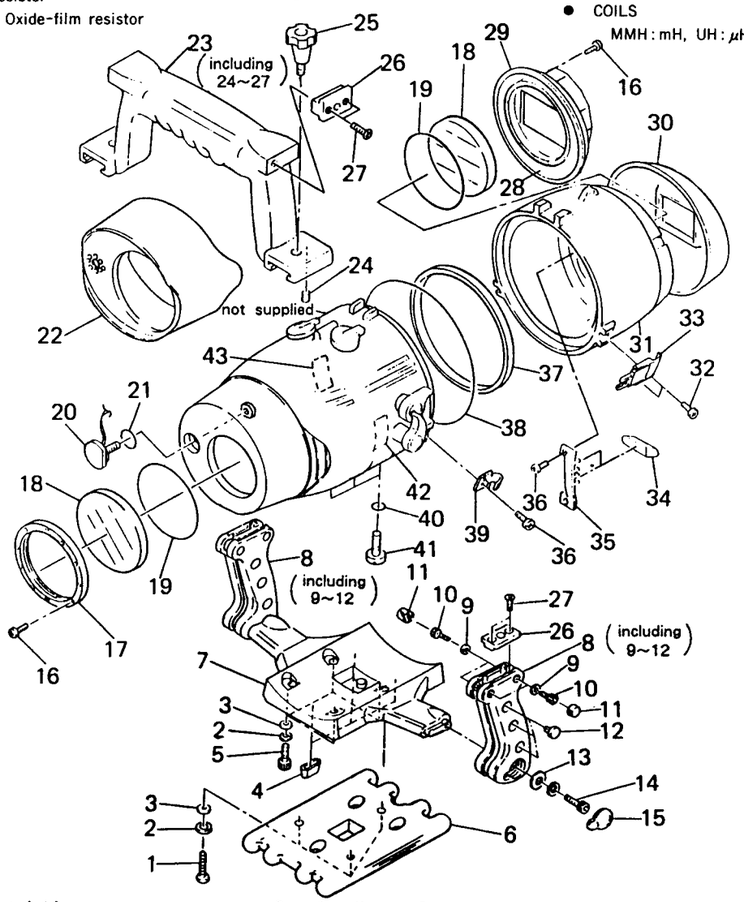
NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable

- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- -XX, -X mean standardized parts, so they may have some difference frome the original one.

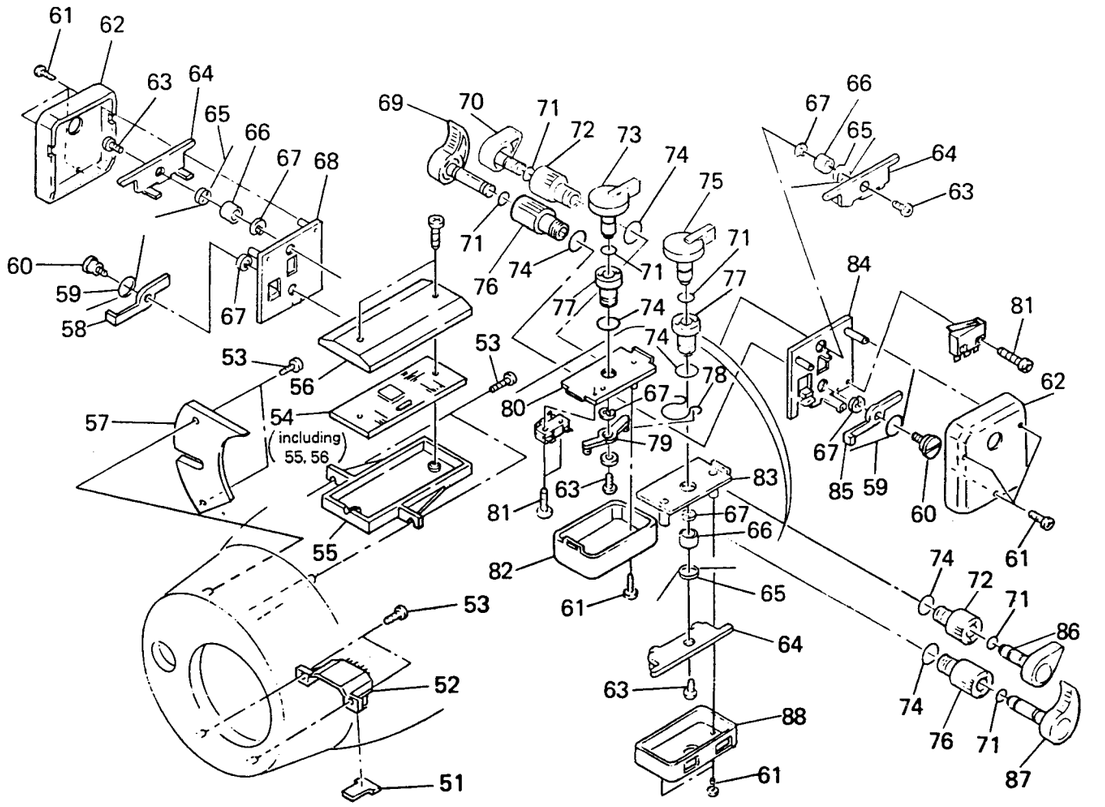
- SEMICONDUCTORS
  In each case, U: μ, for example:
  UA....: μA...., UPA....: μPA....,
  UPB....: μPB...., UPC....: μPC....,
  UPD....: μPD....
- CAPACITORS
  MF: μF, PF: μμF
- COILS
  MMH: mH, UH: μH

(1)



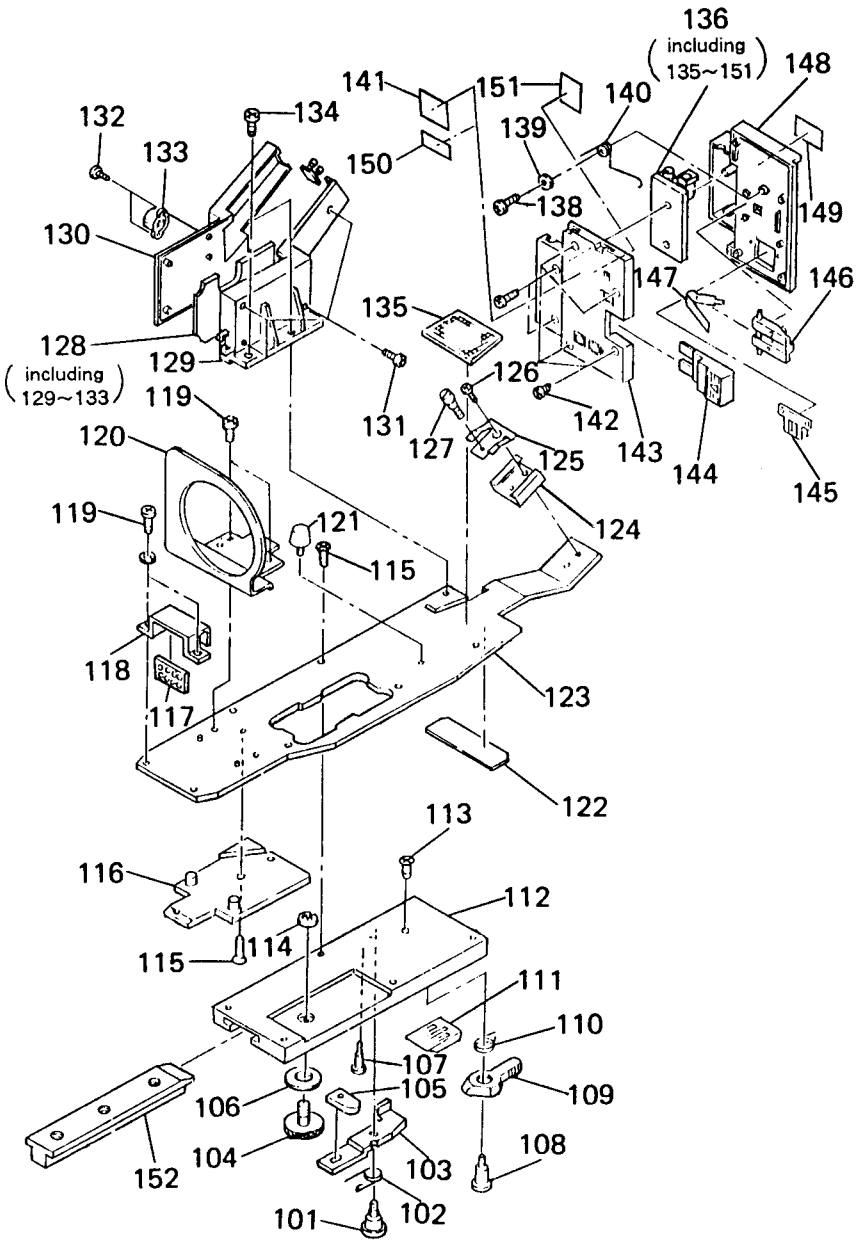
No.	Part No.	Description	Remark
1	2-181-606-01	SCREW, TRUS	
2	2-181-604-01	WASHER, SW6 SPRING	
3	2-181-603-01	WASHER, W6	
4	2-181-635-01	COVER, GRIP BASE RUBBER	
5	2-181-602-01	BOLT, HEXAGON SOCKET	
6	*2-181-682-01	WEIGHT (A)	
7	*2-181-654-01	BASE, GRIP	
8	X-2115-903-1	GRIP ASSY	
9	2-115-935-01	WASHER, W5	
10	2-115-930-01	BOLT (M5X8), HEXAGON SOCKET	
11	2-115-916-01	COVER, INSERT FITTING SCREW	
12	2-115-915-01	COVER, GRIP ASSY SCREW	
13	2-115-917-01	WASHER, GRIP FIXED	
14	2-115-931-01	BOLT, HEXAGON SOKET	
15	2-115-914-01	COVER, GRIP FITTING SCREW	
16	2-115-925-11	SCREW (2) (M2X10), TAPPING	
17	2-181-642-01	RING, FRONT GLASS RETAINER	
18	*2-181-618-01	GLASS, FRONT	
19	2-181-670-11	RING, O	
20	1-542-114-11	MICROPHONE, UNDERWATER	
21	2-181-670-61	RING, O	
22	*2-181-652-01	PROTECTOR, FRONT	
23	*A-6767-953-A	HANDLE BLOCK ASSY	
24	2-398-051-01	SCREW (M4X4), 6 SQUARE HOLE	
25	2-398-015-01	BOLT, ARM FIXED	
26	2-115-923-01	SHOE, BRACKET	
27	2-115-929-01	SCREW (M5X20), (+) (K)	
28	2-182-544-01	WEIGHT (R)	
29	*2-182-503-01	RETAINER, REAR GLASS	
30	2-182-509-11		
31	*2-182-511-01	CASE, REAR	
32	2-391-514-00	SCREW, + P 3.5	
33	2-390-778-02	BUCKLE	
34	*2-181-696-03	GUIDE, LIGHT	
35	*2-181-695-01	HOLDER, LIGHT GUIDE	
36	2-181-605-01	SCREW (M3.5X8)	
37	2-181-617-01	PACKING, WATERPROOF	
38	2-181-670-01	RING, O	
39	2-115-906-01	RETAINER, BUCKLE	
40	2-181-670-41	RING, O	
41	2-181-607-01	SCREW, RAIL FITTING	
42	*2-182-547-01	LABEL, MODEL NUMBER	
43	*2-181-664-01	LABEL, CAUTION	

(2)



No.	Part No.	Description	Remark
51	*1-608-523-00	SS-15 BOARD	
52	2-181-641-01	HOLDER, 8P CONNECTOR	
53	2-181-605-01	SCREW (M3.5X8)	
54	*A-6767-943-A	REMOTE CONTROL BLOCK ASSY	
55	*2-181-678-01	CASE, REMOTE CONTROL	
56	*2-181-673-01	LID, REMOTE CONTROL CASE	
57	*2-181-679-01	WEIGHT (D)	
58	2-182-542-01	PLATE, FUNCTION, FOCUS SWITCH	
59	2-181-610-01	SPRING (B)	
60	2-181-608-01	SCREW, FUNCTION PLATE FITTING	
61	7-621-255-32	SCREW +P 2X5	
62	*2-181-644-01	COVER, REC SWITCH	
63	2-115-928-01	SCREW (M4X6),	
64	2-182-504-01	PLATE, FUNCTION, ZOOM SWITCH	
65	2-182-535-01	SPRING (D)	
66	2-182-534-01	COLLAR	
67	2-115-932-01	RING (6), E	
68	X-2181-613-1	BASE ASSY, SWITCH, FOCUS	
69	2-181-647-01	LEVER, REC	
70	*2-182-527-01	LEVER, ZOOM	
71	2-115-924-41	RING, O	
72	2-182-541-01	BEARING (C)	
73	2-181-646-01	LEVER, POWER SWITCH	
74	2-181-670-31	RING, O	
75	2-182-506-01	LEVER, EDIT SEARCH SWITCH	
76	2-181-633-01	BEARING (B)	
77	2-181-632-01	BEARING (A)	
78	2-181-609-01	SPRING (A)	
79	X-2181-603-1	PLATE ASSY, FUNCTION, SWITCH	
80	X-2181-602-1	BASE ASSY, POWER SWITCH	
81	7-621-255-55	SCREW +P 2X8	
82	*2-181-643-01	COVER, POWER SWITCH	
83	X-2181-614-1	BASE ASSY, SWITCH, EDIT SERCH	
84	X-2181-604-1	BASE ASSY, REC SWITCH	
85	2-181-627-01	PLATE, FUNCTION, REC SWITCH	
86	*2-182-526-01	LEVER, FOCUS	
87	2-182-505-01	LEVER, FOCUS SELECTION	
88	*2-182-507-01	COVER, EDIT SEARCH SWITCH	

(3)



No.	Part No.	Description	Remark
101	2-181-629-01	SHAFT, AUTO LOCK RELEASE LEVER	
102	2-181-611-01	SPRING (C)	
103	2-181-636-01	LEVER, RELEASE, AUTO LOCK	
104	2-181-612-01	SCREW, BASE FIXED	
105	X-2181-609-1	LEVER ASSY, AUTO LOCK	
106	2-181-601-01	WASHER, BASE FIXED SCREW	
107	2-181-623-01	STOPPER (C)	
108	2-181-672-01	SHAFT, LOCK LEVER	
109	2-181-677-01	LEVER, LOCK	
110	2-181-671-01	SPRING	
111	2-181-676-01	PLATE, LOCK	
112	*2-181-681-01	GUIDE, CAMERA MOUNT	
113	7-682-248-09	SCREW +K 3X8	
114	2-391-512-00	RING (5), RETAINING, E TYPE	
115	7-682-249-09	SCREW +K 3X10	
116	*2-181-634-01	PLATE, GUIDE, RAIL	
117	2-181-674-01	RETAINER, CONNECTOR	
118	2-181-685-01	CASE, CONNECTOR RETAINER	
119	7-682-147-15	SCREW +P 3X6	
120	2-181-699-03	BRACKET, LENS	
121	2-181-680-01	CUSHION (A), RUBBER, SCREW	
122	2-181-688-01	PLATE, INDICATION, LOCK	
123	*2-182-538-02	MOUNTED PCB, CAMERA	
124	3-688-985-01	SHOE, ACCESSORY	
125	3-688-940-11	SPRING, LEAF	
126	7-685-203-19	SCREW +KTP 2X5 TYPE2 SLIT	
127	2-182-540-01	SCREW (M2X0.4), STOPPER	
128	*A-6767-951-A	BOX BLOCK ASSY	
129	2-182-529-02	CASE (B)	
130	2-182-528-01	CASE (A)	
131	7-685-134-19	SCREW +P 2.6X8 TYPE2 SLIT	
132	7-685-133-19	SCREW +BTP 2.6X6 TYPE2 N-S	
133	1-529-074-11	BUZZER, PIEZOELECTRIC	
134	7-682-547-09	SCREW +P 3X6	
135	*2-182-539-01	RUBBER, CAMERA MOUNT	
136	*A-6768-024-A	ADAPTOR BLOCK ASSY, BATTERY	
137	7-685-235-19	SCREW +KTP 2.6X10 TYPE2 SLIT	
138	7-627-552-47	SCREW, PRECISION +P 1.7X4	
139	7-688-001-01	W 2, SMALL	
140	2-182-522-01	SPRING	
141	*2-182-523-01	LABEL, MODEL NUMBER	
142	7-685-132-19	SCREW +P 2.6X5 TYPE2 NON-SLIT	
143	2-182-531-01	CASE (LOWER), BATTERY ADAPTOR	
144	2-182-519-01	KNOB, RELEASE	
145	1-535-658-11	TERMINAL BOARD	
146	2-182-520-01	CLAW, BATTERY LOCK	
147	2-182-521-01	SPRING	
148	2-182-530-02	CASE (UPPER), BATTERY ADAPTOR	
149	*3-719-683-01	LABEL, BATTERY FITTING	
150	*3-703-978-01	LABEL (A), FIRE CAUTION	
151	3-725-142-01	LABEL, FUSE	
152	*2-181-648-01	RAIL, CAMERA MOUNT GUIDE	

RC-27 LS-16

SECTION 4
ELECTRICAL PARTS LIST

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- -XX, -X mean standardized parts, so they may have some differences from the original one.

Ref.No	Part No.	Description	Remark
		RC-27 BOARD	
		**********	
		CAPACITOR	
C001	1-124-234-00	CAP, ELECT 22MF	
C002	1-102-129-00	CAP, CERAMIC 0.01MF B	
C003	1-126-094-11	CAP, ELECT 4.7MF	
C004	1-102-110-00	CAP, CERAMIC 220PF B	
C005	1-102-110-00	CAP, CERAMIC 220PF B	
C006	1-126-160-11	CAP, ELECT 1.0MF	
C007	1-124-234-00	CAP, ELECT 22MF	
C008	1-126-160-11	CAP, ELECT 1.0MF	
C009	1-126-157-11	CAP, ELECT 10MF	
C010	1-126-157-11	CAP, ELECT 10MF	
		DIODE	
D001	8-719-109-84	DIODE RD5.1ESB1	
D002	8-719-911-19	DIODE 1SS119	
D003	8-719-911-19	DIODE 1SS119	
D004	8-719-911-19	DIODE 1SS119	
D005	8-719-911-19	DIODE 1SS119	
D006	8-719-911-19	DIODE 1SS119	
D007	8-719-911-19	DIODE 1SS119	
D008	8-719-911-19	DIODE 1SS119	
D009	8-719-911-19	DIODE 1SS119	
D010	8-719-911-19	DIODE 1SS119	
D011	8-719-911-19	DIODE 1SS119	
D012	8-719-911-19	DIODE 1SS119	
D013	8-719-911-19	DIODE 1SS119	
D014	8-719-911-19	DIODE 1SS119	
		IC	
IC001	8-759-142-56	IC UPD7503G-A71-12	
IC002	8-759-240-69	IC TC4069UBP	
IC003	8-759-240-24	IC TC4024BP	
IC004	8-759-245-38	IC TC4538BP	
IC005	8-759-913-41	IC S-8054ALB	
		TRANSISTOR	
Q001	8-729-900-89	TRANSISTOR DTC144ES	
Q002	8-729-178-54	TRANSISTOR 2SC2785-F	
Q003	8-729-900-89	TRANSISTOR DTC144ES	
Q004	8-729-900-89	TRANSISTOR DTC144ES	
Q005	8-729-900-65	TRANSISTOR DTA144ES	
Q006	8-729-900-89	TRANSISTOR DTC144ES	
Q007	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q008	8-729-178-54	TRANSISTOR 2SC2785-F	
		RESISTOR	
R001	1-249-409-11	RES, CARBON (SMALL) 220	
R002	1-249-429-11	RES, CARBON (SMALL) 10K	
R003	1-249-437-11	RES, CARBON (SMALL) 47K	
R004	1-249-441-11	RES, CARBON (SMALL) 100K	
R005	1-249-437-11	RES, CARBON (SMALL) 47K	
R006	1-249-429-11	RES, CARBON (SMALL) 10K	
R007	1-249-441-11	RES, CARBON (SMALL) 100K	
R008	1-249-441-11	RES, CARBON (SMALL) 100K	
R009	1-249-429-11	RES, CARBON (SMALL) 10K	
R010	1-249-429-11	RES, CARBON (SMALL) 10K	
R011	1-249-429-11	RES, CARBON (SMALL) 10K	
R012	1-249-429-11	RES, CARBON (SMALL) 10K	
R013	1-249-429-11	RES, CARBON (SMALL) 10K	
R014	1-249-429-11	RES, CARBON (SMALL) 10K	
R015	1-247-903-00	RES, CARBON (SMALL) 1.0M	
R016	1-247-883-00	RES, CARBON (SMALL) 150K	
R017	1-247-883-00	RES, CARBON (SMALL) 150K	
R018	1-249-441-11	RES, CARBON (SMALL) 100K	
R019	1-249-413-11	RES, CARBON (SMALL) 470	
R020	1-249-441-11	RES, CARBON (SMALL) 100K	
R021	1-247-891-00	RES, CARBON (SMALL) 330K	
R022	1-247-891-00	RES, CARBON (SMALL) 330K	
R023	1-249-441-11	RES, CARBON (SMALL) 100K	
R024	1-249-441-11	RES, CARBON (SMALL) 100K	
R025	1-247-840-00	RES, CARBON (SMALL) 2.4K	
		CRYSTAL	
X001	1-527-532-00	OSCILLATOR, CERAMIC	
		**********	
		LS-16 BOARD	
		**********	
		CAPACITOR	
C001	1-126-160-11	CAP, ELECT 1.0MF	
C002	1-126-162-11	CAP, ELECT 3.3MF	
C003	1-126-162-11	CAP, ELECT 3.3MF	
C004	1-124-589-11	CAP, ELECT 47MF	
		DIODE	
D101	8-719-812-32	DIODE TLY123	
D102	8-719-812-31	DIODE TLR123	
		IC	
IC001	8-759-103-93	IC UPC393C	
IC002	8-759-240-11	IC TC4011BP	
		IC	
Q001	8-759-900-33	IC SN74LS33N	
Q002	8-759-900-33	IC SN74LS33N	
		RESISTOR	
R001	1-249-423-11	RES, CARBON (SMALL) 3.3K	
R002	1-247-882-11	RES, CARBON (SMALL) 130K	
R003	1-249-421-11	RES, CARBON (SMALL) 2.2K	
R004	1-249-429-11	RES, CARBON (SMALL) 10K	
R005	1-247-852-01	RES, CARBON (SMALL) 7.5K	

Ref.No	Part No.	Description	Remark
R006	1-249-437-11	RES, CARBON (SMALL) 47K	
R007	1-249-437-11	RES, CARBON (SMALL) 47K	
R008	1-247-903-00	RES, CARBON (SMALL) 1.0M	
R009	1-247-881-01	RES, CARBON (SMALL) 120K	
R010	1-247-819-01	RES, CARBON (SMALL) 330	
		BUZZER	
SP001	1-529-074-11	BUZZER, PIEZOELECTRIC	

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PC-34 BOARD
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		CAPACITOR	
C001	1-124-589-11	CAP, ELECT 47MF	
C002	1-102-129-00	CAP, CERAMIC 0.01MF B	
		CONNECTOR	
CN001	1-535-658-11	TERMINAL BOARD	
		FUSE	
F001	1-532-778-21	FUSE, MICRO (SECONDARY)	
		TRANSISTOR	
Q001	8-729-113-32	TRANSISTOR 2SB733-3	
Q002	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q003	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q004	8-729-140-21	TRANSISTOR 2SA1444	
Q005	8-729-900-67	TRANSISTOR DTA124XS	
		RESISTOR	
R001	1-249-387-11	RES, CARBON (SMALL) 3.3	
R002	1-249-425-11	RES, CARBON (SMALL) 4.7K	
R003	1-249-418-11	RES, CARBON (SMALL) 1.2K	
R004	1-249-421-11	RES, CARBON (SMALL) 2.2K	
R005	1-249-427-11	RES, CARBON (SMALL) 6.8K	
R006	1-249-441-11	RES, CARBON (SMALL) 100K	
R007	1-249-413-11	RES, CARBON (SMALL) 470	

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MISCELLANEOUS
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CNP001	1-556-757-21	CORD (WITH PLUG)	
CNP002	1-574-052-31	CORD, CONNECTION	
CNP003	1-559-208-11	CORD (WITH PLUG)	
MIC001	1-542-114-11	MICROPHONE, UNDERWATER	
S002	1-553-636-00	SWITCH, MICRO (POWER)	
S003	1-553-636-00	SWITCH, MICRO (REC)	
S004	1-553-636-00	SWITCH, MICRO (ZOOM TELE)	
S005	1-553-636-00	SWITCH, MICRO (ZOOM WIDE)	
S006	1-553-636-00	SWITCH, MICRO (FOCUS NEAR)	
S007	1-553-636-00	SWITCH, MICRO (FOCUS FAR)	
S008	1-553-636-00	SWITCH, MICRO (AOTO FOCUS)	
S009	1-553-636-00	SWITCH, MICRO (EDIT -)	
S010	1-553-636-00	SWITCH, MICRO (EDIT +)	

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ACCESSORIES AND PACKING MATERIALS
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Part No.	Description	Remark
X-2181-612-1	BASE (V88E/V11) ASSY	
X-2181-618-1	BASE (V900E/V99) ASSY	
X-2181-619-1	BASE (V89) ASSY	
1-574-394-11	CORD, POWER CONNECTION	
2-115-921-01	GREASE	
2-181-617-01	PACKING, WATERPROOF	
2-181-670-01	RING, O	
3-786-616-23	INSTRUCTIONS MANUAL	
*2-182-515-11	INDIVIDUAL CARTON	
*2-182-516-01	CUSHION (UPPER)	
*2-182-517-01	CUSHION (LOWER)	
*2-182-518-01	PLATE, PROTECTION	
*2-182-536-01	LENS, WIDE CONVERSION	

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